Tuesday, November 13th….

Announcements….
• Homework 8 - due today
• Midterm Paper 2 - due Tuesday, Nov. 20
In the news…. More fuel to the legal confrontation between states and the federal government over greenhouse gas regulation.

**California, other states sue U.S. on car emissions**

by Reuters News on 08 November 2007, 16:29 PM

Categories: Reuters News

By Adam Tanner

SAN FRANCISCO, Nov 8 (Reuters) - California sued the U.S. Environmental Protection Agency on Thursday, demanding a quick federal decision that would allow the nation's most populous state to limit greenhouse gas emissions from vehicles.

"California is ready to implement the nation's cleanest standards for vehicle emissions, but we cannot do that until the federal government grants a waiver allowing us to enforce those standards," Gov. Arnold Schwarzenegger said.

The long-threatened legal action follows a 2005 California law requiring new vehicles to meet tighter standards for emissions, starting with 2009 models introduced next year.

California needs a waiver from the federal government because it is seeking to impose stricter standards than those imposed under federal law. The legal filing asks the court to force an EPA decision on the matter.

If the EPA denies the waiver, "we sue again, and sue again, and sue again until we get it," Schwarzenegger told reporters.

The federal agency "has unreasonably delayed action on the requested waiver," according to the lawsuit filed in the U.S. District Court for the District of Columbia.

"Automotive emissions of greenhouse gases are increasing more rapidly than any other source," the lawsuit said. "The longer the delay in reducing these emissions, the more costly and harmful will be the impact on California."

EPA spokeswoman Jennifer Wood said her agency plans to make a decision by the end of December.

"We're less than two months away and clearly California is more interested in getting a good headline than in giving us the time to make a good decision," she said.

Sixteen other states have either adopted or are considering similar emissions rules, and many joined the lawsuit.

"We are filling the void left by the Bush Administration's refusal to protect the environment," New York Attorney General Andrew Cuomo said in a statement.

"If the federal government won't lead on this critical issue, it should get out of the way of states like New York that are moving forward with sensible steps to address the climate crisis."

U.S. automakers are fighting California's environmental plans in the courts. In a separate case, a U.S. federal judge threw out a California lawsuit in September that sought to hold vehicle manufacturers responsible for damages caused by climate-changing greenhouse gases.

Last year, California passed a law calling for the most far-reaching greenhouse gas emissions reductions in the United States, saying it would cut global warming gases to 1990 levels by 2020 -- or by 25 percent from current levels.

(Additional reporting by Deborah Zabarenko; editing by Todd Eastham)
Related to today’s class…..investing in carbon reductions overseas.

Ecolutions to invest IPO proceeds in China, India

by Reuters News on 12 November 2007, 05:57 AM
Categories: Reuters News

FRANKFURT, Nov 12 (Reuters) - German carbon project developer Ecolutions, which aims for a stock listing in December, wants to invest the proceeds from its flotation in carbon-cutting projects in China and India, it said.

"The funds we raise will go completely into our product pipeline and into the development of climate protection projects," Chief Executive Ralf Jungebloed told a news conference in Frankfurt on Monday.

Ecolutions aims to raise up to 48 million euros ($70.06 million) by selling up to 10 million shares from a capital increase for 4.10-4.80 euros each.

Ecolutions invests in renewable energy projects in China and India, which generate carbon emission reduction certificates, and sells these to emitters which must cover their production under mandatory European Union carbon trading rules.

Under the Kyoto Protocol on global warming, companies in rich countries can meet domestic emission goals by buying carbon offsets from developing nations, where it is cheaper to achieve such emission cuts.

The trade in carbon offsets is booming because regulators are reducing the number of CO2 emission permits they hand out to polluters to create incentives to avoid emissions.

Ecolutions' projects include biomass-to-power stations and wind farms.

"The growth potential is enormous,", Jungebloed said, adding the company chose to focus on China and India because it was cheaper to save a tonne of CO2 there than to do so in Europe.

Ecolutions so far has not set up a partner network but is in the process of establishing first distribution channels, said Dietram Oppelt, its chief investment officer.

Ecolutions is the first carbon project developer to list in Germany. It competes with Britain's Camco International <CAO.L>, Trading Emissions <TRE.L> and EcoSecurities <ECO.L>.

Ecolutions expects to raise the number of its projects to 51 in 2010 from 15 in 2008, it said in a presentation, aiming to generate 2,678 certificates in 2010, up from 313 in 2008.

Ecolutions' subscription period starts on Nov. 27 and ends on Nov. 29. The first day of trading is set for Dec. 6. It aims for a listing in the open market segment of Frankfurt's Deutsche Boerse <DB1Gn.DE>.

(Reporting by Eva Kuehnen, Editing by David Cowell) ((eva.kuehnen@reuters.com; 49 69 7565 1207; Reuters Messaging: eva.kuehnen.reuters.com@reuters.net))

($1=.6852 EURO)
Although it is off the radar screen in the U.S., the Kyoto protocol is a reality for the international business community.

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**Carbon credit investors call for post-Kyoto clarity**

by Reuters News on 07 November 2007, 06:14 AM

Categories: Reuters News
Topics: kyoto, cdm, un, carbon trading, voluntary market, post-2012, vietnam, unfcoc

By Annika Breidhardt

SINGAPORE, Nov 7 (Reuters) - Billions of dollars set to be invested in projects to reduce carbon emissions could be withdrawn unless global environment leaders promise a successor to the KTyoto Protocol next month, carbon market traders said.

The United Nations' clean development mechanism (CDM) scheme allows rich countries to meet domestic greenhouse gas emissions limits by buying carbon offsets from developing nations, investing in emissions-cutting projects.

Project developers and offset traders are calling for clarity ahead of a meeting of world governments in Bali, Indonesia, next month that aims to begin negotiations on mapping out a plan to fight global warming to succeed the Kyoto Protocol, which expires in 2012.

"The big problem with the system is its unclear future post-2012, so it's hard for us to convince project managers even though we ourselves know it is going to continue," said Dang Hong Hanh, deputy director of Vietnam Energy and Environment Consultancy, on Wednesday.

"We need some clear, official signal that it will," said Hanh, whose company has five approved projects in Vietnam, all hydropower, in its portfolio, and another 18 in the approval process. She was speaking at a carbon market conference in Singapore.

The 2012 cut-off has project developers rushing to get schemes up and running in time to turn a profit by then. One of these, EcoSecurities &ECO.L, said on Tuesday earnings would not meet expectations, blaming U.N. red tape for slowing its business.

Carbon trading under the CDM was worth $5 billion last year, part of a global carbon market that is expected to be worth at least $60 billion this year.

"Unfortunately I can only trade until 2012 because there's no pricing data available and there's no certainty beyond that," said Eric Boonman of Fortis Bank.

"Given the fact that the banks in the CDM and the EU carbon market are providing a lot of liquidity, it would be good if they got something, so we could get the market off the ground and start trading," he added.

The price of offsets, called certified emissions reductions (CERs), trade at about three times the price of carbon credits in a less regulated voluntary emissions reduction (VER) market.

Hanh said more capital would turn to the VER market, if officials in Bali did not send a clear signal.

U.N. climate chief Yvo de Boer said he was confident Bali could deliver on these goals.

"The market is beginning to get positive signals from statements from governments," he told the conference.

(Reporting by Annika Breidhardt) (+65 6870 3902; RM: annika.breithardt.reuters.com@reuters.net)
Some movement developing on carbon reductions in Congress.

Republicans urge slowdown on US carbon-cap bill

By Reuters News on 08 November 2007, 15:24 PM

Categories: Reuters News

By Deborah Zabarenko, Environment Correspondent

WASHINGTON, Nov 8 (Reuters) - U.S. Republican senators on Thursday urged a Democratic-led Senate committee to slow its work on a bill to cap climate-warming carbon emissions, arguing that debate is being rushed.

"Climate change is a serious and complex issue that deserves our full attention," Sen. George Voinovich said at an environment committee hearing. "So I'm asking, could you slow it down?"

Voinovich, an Ohio Republican, acknowledged the desire to get a law passed quickly, but said, "The abbreviated process I don't believe is conducive to good public policy."

Sen. Barbara Boxer, a California Democrat who chairs the committee, noted that the committee has held 20 hearings on climate change, including some provisions included in America's Climate Security Act, the bill under consideration.

"We are not rushing this through, we are doing this in the right way," Boxer said at the first of two hearings to consider the bill. The second is set for next Tuesday.

The measure, sponsored by Virginia Republican Sen. John Warner and Connecticut independent Sen. Joe Lieberman, is seen as a bipartisan victory simply for moving beyond a small subcommittee and getting to discussion in a full committee.

Boxer has indicated she wants the full committee to approve the measure by the end of the year. That would mesh with a global conference on climate change in Bali, Indonesia.

Voinovich made note of this timetable: "I know that Bali is coming up in December and I know that some people would like go with maybe a scalp in their hand (to show) we're doing something but ... this is too important to rush it down the road."

Action would still be needed in the full Senate and House of Representatives before it could be sent to President George W. Bush for his consideration. Bush has opposed mandatory carbon caps, saying they would hurt the U.S. economy.

Voinovich and fellow Republican senators Kit Bond of Missouri, David Vitter of Louisiana and Larry Craig of Idaho all took exception to the bill, as did the leading Republican committee member, James Inhofe of Oklahoma.

But Warner, the bill's Republican co-sponsor, sent a message to the committee that was read by Boxer, noting that the panel failed to take up an earlier climate change measure.

"This committee had a chance to hold hearings on McCain-Lieberman (the earlier bill) and did not," Warner wrote. "We are making up for lost time in this Congress."

(Editing by Jackie Frank)
The most environmentally friendly scenarios, result in temperature rises of between 1.8C (3.2F) and 2.4C (4.3F) over the next century, while the “business as usual” fossil fuel scenario gives a rise of 4.0C (7.2F).

- How much global warming is acceptable?
- When will the world enter the “danger zone”?
- What criteria defines a danger zone?
The United Nations Framework Convention on Climate Change (UNFCCC) is the international body established to formulate and implement the global response to climate change. UNFCCC’s basic criteria for acceptable global warming is set out in its objective statement.

ARTICLE 2: OBJECTIVE - The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.
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What amount of global warming and what atmospheric CO₂ levels are consistent with these goals?
This question was examined carefully in the 2003 report of the German Advisory Council on Global Change.

What maximum CO₂ levels will achieve this maximum level of warming?

This question was examined carefully in the 2003 report of the German Advisory Council on Global Change.

**The WBGU’s recommendation: A maximum of 2°C warming is acceptable**

The WBGU reaffirms its conviction that in order to avert dangerous climatic changes, it is essential to comply with a ‘climate guard rail’ defined by a maximum warming of 2°C relative to pre-industrial values. As the global mean temperature has already risen by 0.6°C since the onset of industrialization, only a further warming by 1.4°C is tolerable. A global mean long-term warming rate of at most 0.2°C per decade should not be exceeded.

This climate window should be agreed as a global objective within the context of the UNFCCC process. The European Union should seek to adopt a leading role on this matter.

**The WBGU’s recommendation: Adopt ambitious emissions reduction targets**

In view of the major uncertainties concerning the climate system, the WBGU recommends a hedging strategy in which initially a CO₂ concentration target below 450 ppm is aimed at. This will only be possible if by 2050 global energy-related CO₂ emissions can be reduced by about 45–60% from 1990 levels. Furthermore, it will be essential to achieve substantial reductions of the other greenhouse gases (notably methane and nitrous oxide, but also the fluorinated compounds) and of further indirectly radiatively active substances (e.g. soot). Therefore, industrialized countries must reduce their greenhouse gas emissions by at least 20% by 2020.
What are world governments doing to achieve these goals?

The 1997 Kyoto Protocol, negotiated in the context of the UNFCCC, places limits on greenhouse gas emissions.

Countries are divided into 2 groups

- developed (Annex I) countries, with high per capita greenhouse gas emissions
- developing (non-Annex I), with low per capita emissions.

These two groups have very different responsibilities under the Kyoto agreement.

In short, developed countries must cut their emissions, while developing countries (including China and India) are allowed to continue to have growing emissions.

This is a great bone of contention…
The basic positions ….

The U.S. and Australia have refused to ratify the Kyoto Protocol, because of the exemption of major greenhouse gas emitters, e.g. China & India, in the developing world.

The U.S. argues that its economy would be unfairly hampered, unless all the major greenhouse gas emitters are required to make reductions.

China argues that although its total emissions are high, the focus should be on country’s emissions per capita. Its people should be allowed the same standard of living as in developed nations.

Figure produced by Global Warming Art www.globalwarmingart.com
Clearly without U.S. participation and without placing limits on major greenhouse gas emitters China and India, the Kyoto agreement has major flaws.

Nonetheless, it represents progress towards global cooperation on limiting greenhouse gas emissions.

How does the Kyoto Protocol work?

This is the basic position of developed countries that have signed on to the Kyoto Protocol, i.e. all Annex I countries except the U.S. and Australia.
According to the United Nations Environment Programme,

"The Kyoto Protocol is an agreement under which industrialized countries will reduce their collective emissions of greenhouse gases by 5.2% compared to the year 1990 (but note that, compared to the emissions levels that would be expected by 2010 without the Protocol, this limitation represents a 29% cut). The goal is to lower overall emissions of six greenhouse gases - carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, HFCs, and PFCs - calculated as an average over the five-year period of 2008-12. National limitations range from 8% reductions for the European Union and some others to 7% for the US, 6% for Japan, 0% for Russia, and permitted increases of 8% for Australia and 10% for Iceland."

The Kyoto Protocol came into force on Feb. 16th, 2005 after Russia’s ratification of the treaty satisfied its 55% clause.

According to article 25 of the protocol, it enters into force "on the ninetieth day after the date on which not less than 55 Parties to the Convention, incorporating Parties included in Annex I which accounted in total for at least 55% of the total carbon dioxide emissions for 1990 of the Parties included in Annex I, have deposited their instruments of ratification, acceptance, approval or accession." (wikipedia)
The Kyoto Protocol is a **cap and trade** system…..

Greenhouse gas emissions from Annex I countries are capped. They are required to reduce emissions by an average of 5.2% below 1990 levels over the period 2008-2012.

Countries then in turn mandate greenhouse gas reductions from all their major industrial emitters.

Annex I countries can achieve these targets in 2 ways….

1) Actually reducing GHG emissions.
2) Buying GHG emission credits

This is the trade part of “cap and trade”

Emission credits can come in two forms ….
- from Annex I countries that have reduced their emissions by more than their required amounts.
- from non-Annex I countries through **Certified Emissions Reductions** (CER’s) approved by the **Clean Development Mechanism** (CDM) Executive Board.
Clean Development Mechanism

- Encourages Annex I countries to invest in emission reduction projects in non-Annex I countries. It may be more cost effective for companies in Annex I countries to reduce emissions in developing nations rather than at home.

- Spurs the transfer of energy efficient and renewable energy technologies from industrialized countries to developing nations.

The main criteria for approval of a CER project by the CDM Board is that the project **would not have happened without the additional incentive of the CER.**

Whether a given project satisfies this can be a matter of some debate.....
So far…
• 828 CER projects have been approved representing 171 million tons of CO$_2$ equivalent emissions.
• 2600 more projects are in the pipeline, representing 2.5 GtCO$_2$ equivalent reductions.

Recall that annual world CO$_2$ emissions from fossil fuels are $7.2 \text{ GtC/year} = 26.4 \text{ GtCO}_2/\text{year}$
Two important (& related) questions….

• What are CO$_2$ equivalent reductions?

• Why have so many CER’s focused on reductions in hydrofluorocarbon (HFC) emissions?
Two important (& related) questions….

• What are CO₂ equivalent reductions?

In order to compare the impact of different greenhouse gases, IPCC assigns each gas a **global warming potential** (GWP) relative to CO₂.

A gas’s GWP depends on how much IR radiation it absorbs and on how long it stays active in the atmosphere.

If a gas x has, for example, a gwp of 10, then the impact of 1 ton of x on the greenhouse effect is the same as 10 tons of CO₂.
Why have so many CER’s focused on reductions in hydrofluorocarbon (HFC) emissions?

HFC’s have very large GWP’s

Removing a ton of HFC-23 from the atmosphere is equivalent to removing 11,700 tons of CO₂.

<table>
<thead>
<tr>
<th>Gas</th>
<th>Atmospheric Lifetime</th>
<th>GWP a</th>
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<tbody>
<tr>
<td>Carbon dioxide (CO₂)</td>
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<tr>
<td>Methane (CH₄) b</td>
<td>12±3</td>
<td>21</td>
</tr>
<tr>
<td>Nitrous oxide (N₂O)</td>
<td>120</td>
<td>310</td>
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<tr>
<td>HFC-23</td>
<td>264</td>
<td>11,700</td>
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<tr>
<td>HFC-32</td>
<td>5.6</td>
<td>650</td>
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<tr>
<td>HFC-125</td>
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<td>HFC-134a</td>
<td>14.6</td>
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<td>HFC-143a</td>
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<td>HFC-4310mee</td>
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<tr>
<td>SF₆</td>
<td>3,200</td>
<td>23,900</td>
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CER’s are valued according to how many tons CO\textsubscript{2} equivalent are diverted from the atmosphere. Each CER represents 1 tonne = 10\textsuperscript{3} kg of CO\textsubscript{2} equivalent emissions reductions.

A project that removes 1 tonne of HFC-23 is worth 11,700 CER’s.

HFC-23 reduction projects have yielded immense profits (from the sale of CER’s) for relatively modest investments in actual greenhouse gas reductions.

• HFC’s are refrigerants, or byproducts of industrial processes to make refrigerants…
• HFC-23 can be cheaply & easily destroyed by incineration.

Approved CER’s by project type
• The high concentration of HFC projects has been an embarrassment for the CDM, since these gains could have been achieved much more cheaply.

• Revisions of the Kyoto CDM mechanism to better encourage renewable energy projects, and projects in poorer nations have been worked out. (The trend was in this direction in any case, as most of the possible “low hanging” HFC projects had already been exploited).
The list of all approved CDM projects is available at http://cdm.unfccc.int/Projects/registered.html

Approved 10/23/07 - with CO₂ reductions of 13,331 Tonnes per year.

Project Information

Project Name: 7.25 MW wind energy project of Aruppukottai Sri Jayavilas Ltd, Tamilnadu, India
Country: India
Description: The main purpose of the project activity is the implementation and operation of 7.25 MW wind farm in high wind speed areas of Tamilnadu state in India to generate electricity for consumption for captive use displacing grid electricity.

The project activity consists of 17 wind turbine generators (WTGs) in Tirunelveli district of Tamil Nadu state in India. The project activity has 5 WTGs of 850 kW and 12 WTGs of 250 kW. All the windmills have been commissioned and the generated electricity from WTGs is connected to state electric utility namely Tamil Nadu Electricity Board (TNEB) and transmitted through state grid for consumption for their textile mills.

The project activity generates electricity from a renewable source of energy and the project proponents consume the generated electricity for their operations displacing grid electricity. Thus, the project activity results in reduction of GHG emissions by generating renewable energy without the generation of any GHG and additionally displaces grid electricity for the operation of textile mills.
Most up to date info….
Note that although a tiny number of HFC projects have captured nearly 50% of the CER’s, but there are many other types of projects under way…
The U.S. and Australia have refused to ratify the Kyoto Protocol, because of the exemption of major greenhouse gas emitters, e.g. China & India, in the developing world.

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Figure produced by Global Warming Art www.globalwarmingart.com
In class assignment…..

What is your opinion in this basic disagreement, and why?